

A new subspecies of *Polyommatus icadius* (GROUM-GRZHIMAILO, 1890) from the Russian Altai

(Lepidoptera, Lycaenidae)

by

V. V. IVONIN & O. E. KOSTERIN

received 20.XI.1999

Summary: *Polyommatus icadius* (GROUM-GRZHIMAILO, 1890) was found in the SE (Russian) Altai Mts. in the upper Dzhazator River valley. This population is described as *Polyommatus icadius cicero* subsp. nov. Among others, the main characteristic feature of these butterflies are the much better developed orange submarginal spots on wing underside than in Central Asian (including Dzhungarian) specimens. This continues to a great extent the trend of their increase in this species to the North-East. Finding of this strictly monophagous species on wild chickpeas (*Cicer*) argues against an introductive nature of *Cicer soongaricum* СТЕРН. ex DC. in the Altai.

Резюме: *Polyommatus icadius* (GROUM-GRZHIMAILO, 1890) найден на ЮВ (Русском) Алтае в верховьях р. Джазатор. Эта популяция описывается как *Polyommatus icadius cicero* subsp. nov. Среди прочих, основным ее отличием от среднеазиатских (в том числе дзунгарских) бабочек является гораздо более сильное развитие субмаргинальных оранжевых пятен на нижней стороне крыльев, что в значительной степени продолжает тенденцию их увеличения у этого вида к северо-востоку. Нахождение этого строгого монофага на видах дикого нута (*Cicer*) говорит не в пользу заносной природы *Cicer soongaricum* СТЕРН. ex DC. на Алтае.

Systematics of the genus *Polyommatus* s. str., especially of the species group *Polyommatus icarus* (ROTTEMBURG, 1775), are quite complicated. However, the species *Polyommatus icadius* (GROUM-GRZHIMAILO, 1890) (the chickpea blue) has an advantage as being a subject of a special paper by A. B. ЗНАНКО (1993). Perhaps the most peculiar feature of this species is its strict oligophagy on species of the genus *Cicer* (chickpeas, *Cicer soongaricum* СТЕРН. ex DC. and *C. flexuosum* ЛІПСЬКИЙ so far being known as foodplants) and a corresponding confinement to phytocoenoses incorporating these plants. ЗНАНКО (1993) describes the range of *P. icadius* as follows: "Occurs in Tarbagatai, all the mountain chains of Dzhungaria (and, probably, in West China), in the North (so far not reported from Kunge Alatau) and West Tien Shan, in the mountains of Ghissaro-Alai, the Pamirs, and, probably, Hindu Kush" Thus, the species was not hitherto found on the territory of Russia. At the same time, one of its foodplants, the Dzhungarian chickpea (*Cicer soongaricum*) is known in Russia from the Kosh-Agach District of Altai Republic: the headwaters of the Karagem ("an Argut River tributary upstream of Kara-Ir"), "Uzun-Bom on the Argut River" (КРЫЛОВ, 1933), from the valley of the Dירתantai (Argem) River on the eastern spurs of the Katunskii Mt. Range (Artemov, 1993) and from the Dzhazator River valley (DYACHENKO, 1995; KAMELIN, 1998).

In 1998, during stationary studies in the Dzhazator River upper flow, we were lucky to found out both the Dzhungarian chickpea growing in abundance and, as well, the blue species under discussion, in mass quantities. The chickpea and chickpea blues were found in two sites:

1. At 2000 m above sea level on the southern slope of a small hilly ridge dividing an ancient valley of the Dzhazator (now abandoned and occupied by an anonymous brook) and its recent valley next to the Akbul River mouth, 7 km upstream of the fall of the Zhumaly River (further in the text this locality will be called "Dry Mountains"). The Dzhungarian chickpea grows here by sparse plots of thickets on steep detrituous slopes. This remarkable plant forms more or less spherical "bushes", it has rather large violet-blue flowers, much resembling the colour of the males of the blues, the finely pubescent foliage and stems covered by a sticky secret with a strong scent of honey and a saltish taste. The chickpeas grew in a plant community with rather small projective cover (about 60%) of the following composition: abundant (cop by DRUDE scale) *Festuca kryloviana* REVERD., *Avenula hookeri* (SCRIBNER) HOLUB, *Ziziphora clinopodioides* LAM.; sparse (sp) *Junpierus pseudosabina* FISCH. et MEY., *Aconogonon alpinum* (ALL.) SCHUR., *Cicer soongaricum*, *Hedysarum gmelinii* LEDEB., *Geranium pratense* L., *Galium verum* L., *Thymus serpyllum* L. s.l., *Campanula rotundifolia* L., *Artemisia santolinifolia* (PAMP.) TURCZ. ex KRASCH., *Psatyrostachys juncea* (FISCH.) NEVSKI., *Poa* aff. *urssulensis* TRIN.; solitary (sol) *Silene* spec., *Pentaphylloides fruticosa* (L.) O. SCHWARZ, *Heracleum dissectum* LEDEB., *Seseli buch-tormense* (FISCH. ex SPRENG.) KOCH., *Lagopsis marrubiastrum* (STEPH.) IK.-GAL., *Allium altaicum* PALL. The first specimens of *P. icadius* were recorded 27.VI.1998, further ones were observed also from 11.–20.VII.1998, then observations were ceased.

2. Detrituous bluffs of the right board of the Dzhazator River valley, 1800–1950 m above sea level, studied by us within 3 km upstream of the fall of the Chikty Rivulet (further called "Dzhazator"). There the chickpea is very abundant and occupies a considerable area, there is no doubt they continue further downstream of the Dzhazator. The vegetation on these bluffs is represented there by: abundant (cop) *Carex pediformis* C. A. MEY., *Poa* aff. *urssulensis*, *Artemisia santolinifolia*, sparse (sp) *Aconogonon alpinum*, *Pentaphylloides fruticosa*, *Stipa zaleskii* WILENSKY, *Geranium pratense*, *Cicer soongaricum*, *Spiraea chamaedryfolia* L., *Ziziphora clinopodioides*, solitary (sol) *Allium lineare* L. and others. This locality was studied on 21.VII.1998 only, the chickpea blues being observed in great abundance. There were quite fresh specimens among them but the majority of individuals was worn out and practically lacking the apical one third of their forewings.

In both localities the habitat of the chickpea blue coincided in detail with those described by ZHDANKO (1993): the butterflies kept to the chickpea thickets on steep detrituous southern slopes, only rarely and to a small distance penetrating to the meadowy areas of floodland where they could be observed together with *Polyommatus icarus*, from which they differed well by a considerably larger size, smaller and paler orange submarginal spots, a much wider basal suffusion of greenish-blue glittering scales on the hindwing underside, and often a reduction of the black dots in the cell on the forewing underside. In cloudy weather the butterflies of both sexes of *P. icadius* rested on the chickpea "bushes" or inside them, sometimes on other plants. In sunny weather the ♂♂ flew swiftly along the slope, permanently as if examining "bushes" of the chickpea but did not sit on them. Often the ♂♂ were seen sitting on the wet ground, stones, or grass at the river bank or flying along the water in places where the river

undermines the bluffs. ♀♀ mostly used to rest on detritus or low on foliage of the chickpea or other neighbouring plants (colour plate XIII, fig. 13), rarely flying from one place to another, they were much less frequently seen at the water. We repeatedly observed imagines feeding on the flowers of *Ziziphora clinopodioides*.

Polyommatus icadius was described as a variety of *P. icarus* from Ferghana, Alai, and the Kunzhut Mountains (GROUM-GRZHIMAILO, 1890). ZHDANKO (1993) wrote that the specimens from the Pamirs have the least developed (up to reduction) submarginal orange spots on the hindwing underside, while they are the best developed in populations from the northern part of the species range (Dzhungaria, the Zailiiskii Alatau Mts.). In the collection of the Siberian Zoological Museum at the Institute for Animal Systematics and Ecology of the Siberian Division of the Russian Academy of Sciences, Novosibirsk, there are specimens of *P. icadius*, collected, as well in the second half of the summer, in the West Pamirs (both sexes, Khorog, the botanical garden and environs, 2900 m above sea level, collected by A. KUZ'YAKIN on 17.VIII.1976 and M. DANILEVSKY on 3.VI.1989) and in the Dzhungarian Alatau Mts. (only ♂♂, the Northern Chain, 5–18 km NE of the city Tekeli, the Kora River lower flow, 1400–1600 m above sea level, 11.VIII.1994, V. DUBATOLOV & O. KOSTERIN leg.; and the Southern Chain, the Tyshkantau Mts., 40 km NNE of the town Zharkent, the Tyshkan River, 2500 m, 24.VII.1994, V. DUBATOLOV & O. KOSTERIN leg.). These specimens fairly support the mentioned trend. Our Altai specimens extend this trend further being its extreme expression. Their differences from the Dzhungarian ones to our mind are great enough to describe them as a new subspecies.

Polyommatus icadius cicero **subspec. nov.**

Material

Holotype ♂: "Dzhazator" [data on the labels: Russia, Siberia, Altai Mts., Kosh-Agach Distr., precipitous stepped southern slopes of the Dzhazator River right bank 5 km upstream of the Zhumaly River mouth, about 1900 m alt.], 21.VII.1998.

Allotype ♀: same locality and date.

Paratypes: "Dry Mountains" [data on the labels: Russia, Siberia, Altai Mts., Kosh-Agach Distr., steppes on southern slopes of a ridge on the Dzhazator River left bank next to the Akbul River mouth, about 2000 m alt.]: 27.VI.1998, 1 ♂; 11.VII.1998, 1 ♂; 12.VII.1998, 4 ♂♂; 14.VII.1998, 1 ♂; 17.VII.1998, 3 ♂♂; 19.VII.1998, 7 ♂♂, 1 ♀; 20.VII.1998, 8 ♂♂, 4 ♀♀ (V. IVONIN, O. KOSTERIN leg.); "Dzhazator": 20.VII.1998, 22 ♂♂, 15 ♀♀ (O. KOSTERIN leg.); 21.VII.1998, 8 ♂♂, 21 ♀♀ (V. IVONIN leg.).

The holotype, allotype, and part of the paratypes are kept in the Siberian Zoological Museum, Novosibirsk, a part of the type series is kept in the private collection by V. IVONIN, a few paratypes are transferred to EMEM (Entomologische Museum, Marktleuthen, Eitschberger).

♂ (colour plate XIII, figs. 1, 2): Forewing length 17–19 mm (17 mm in the holotype), wing expanse 29–31 mm (29 mm in the holotype). Ground colour of wing upperside does not differ from specimens from other regions being bright light-violet-blue with a narrow (about 0.3 mm) black border and white fringe; hindwing foremargin mainly blackish in front of the vein Rs. Ground colour of wing underside very light ash-grey. Basal suffusion of hindwing glittering greenish-blue, it occupies between ¼ and ½ of the wing area, as a rule it expands to an

imaginary line going from the basal black spot in the space between Sc+R1-Rs to the anal angle. On the hindwing the submarginal orange spots are well developed and of a saturated colour; as a rule the orange colour is distinctly seen even on the foremost spots in the spaces Sc+R1-Rs and Rs-M1, but in some specimens may disappear from these spots. Dark submarginal spots are well seen also on the forewing underside, two of them, those in scapes M3-Cu1 and Cu1-Cu2, as a rule being accompanied with orange colour. On the forewing a black spot in the cell may be absent (in about one third of specimens), strongly reduced or normally developed. White-rimmed black discal spots are well expressed both on hind- and forewings. There are from four to six (five in the holotype) postdiscal black spots on the forewing, they are bright and distinct, with inconspicuous white rims. A white band between medial and postdiscal rows of black spots is not seen. Genitalia: of the structure typical for the *Polyommatus icarus* species group.

♀. Fore wing length 17–18 mm (17 mm in the allotype), wing expanse 28–31 mm (28 mm in the allotype). In 12 of 42 ♀♀ collected, the wing upperside is evenly dark-brown (colour plate XIII, figs. 5, 6), sometimes with some admixture of blue scales in the basal area. On both wings darker submarginal spots are noticeable, accompanied with bracket-shaped orange spots. On the forewing there are two or three hardly noticeable spots, or none, on the hindwing there are four to six spots, three or six of which are well expressed. In 30 ♀♀ (including the allotype) the wing upperside is mainly deep violet-blue (colour plate XIII, figs. 3, 4), the foremargin of both wings being blackish-brown up to vein R5 on the forewing and M1 on the hindwing. On the forewing the violet-blue area is bordered with dark submarginal spots fused to each other and to the wing margin, the orange spots on them being absent or hardly noticeable. Transversal vein on the forewing outlined with a black discal spot. On the hindwing the blue-violet colour area extends to the wing margin narrowly bordered with black and contains a row of round black submarginal spots accompanied proximally with black chevrons, spaces between the black spots and chevrons being occupied with orange spots, well expressed in the lower part of the wing and disappearing towards the foremargin; discal spot absent. Ground colour of wing underside relatively dark, brownish-grey, basal suffusion on hindwing glittering-green and rather narrow as hardly reaching a row of 3–4 basal black spots. All submarginal orange spots are large, well developed on both wings; they hardly decrease in size to the wing foremargins and often are fused to each other. All black markings on the forewing are larger than on the hindwing. On the forewing there are as a rule two basal spots (one residing in the cell), they are absent in about ¼ of the specimens. White band between medial and submarginal rows of black spots well expressed. Genitalia: as in the nominotypical subspecies (fig. 1) but in all the six specimens studied the basis of the antevaginal plate is not so concave as it is depicted on fig. 1 in ZHDANKO (1993); noteworthy, this concavity is not seen in all the ♀♀ from the Pamirs studied by us.

Remarks

The butterflies of the new subspecies differ from the Dzhungarian ones, which we consider as belonging to the nominotypical subspecies (colour plate XIII, figs. 7, 8), first of all by much more expressed orange submarginal spots on the wing underside. In the ♂♂ they as a rule are of an intensive colour and are present up to the wing foremargin, in the lower part of the wing they are large, occupying half of the interval between the black spots of the submarginal and medial rows, and are almost fused to each other, their black rims being pointed chevrons. In

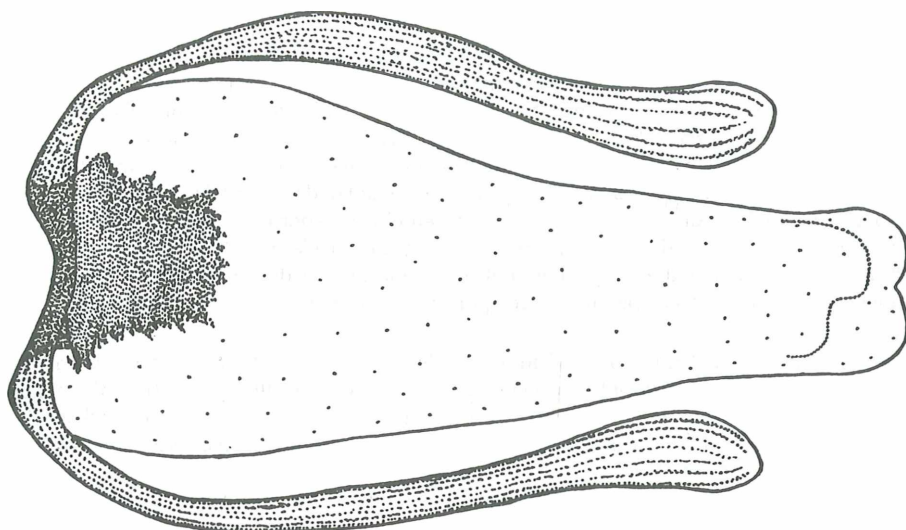


Fig. 1: Female genitalia of *Polyommatus icadius cicero* subsp. nov., paratype, "Dzhazator", 21.VII.1998.

the Dzhungarian specimens the orange spots are dull and small, they occupy less than half of the interval between the black spots of the submarginal and medial rows and are separated from each other by spaces almost equal the spots' widths, their black rims being rounded brackets. In the new subspecies the greenish-blue suffusion is more developed on the hindwing underside, the ground colour is as a rule somewhat darker as compared with the Dzhungarian butterflies. As different from the new subspecies, the Dzhungarian and Pamirian ♂♂ have no or hardly noticeable discal spot. The ♂♂ of the new subspecies have no white brand on the hindwing underside, which is noticeable, although very uncontrasted, in some Dzhungarian and the majority of Pamirian ♂♂. Unfortunately, we have at our disposal no ♀♀ from the Dzhungarian or North Tien Shan for comparison, while differences between the Altaian and Pamirian ♀♀ are drastic: the latter are much smaller, the ground colour of their wing underside is paler, the orange submarginal spots on the wing underside are much smaller and paler while on the upperside they are more developed as being large and well noticeable on the forewing as well. Unfortunately, ZHDANKO (1993) in his paper did not mention deep-blue ♀♀, but he communicated us personally that such ♀♀ occur throughout the species range. As we see, in Altai they dominate.

Etymology

The subspecies is named after the most splendid figure of the ancient Roman culture, whose generic name had been derived from the word "cicer" meaning "pea" or "chickpea", a close relative of the *P. icadius* larval foodplant.

Discussion

In the Altai Mts the Dzhungarian chickpea is known also from the territory of Kazakhstan from the Southern Altai Mt. Range: at the Takyka River (a Kaldzhir River tributary), and in the Bazar River valley (KRYLOV, 1933). These localities are about 130 km SW of our one and should resemble it much with respect to the natural conditions. This plant seems to be absent from lower and more dry mountains of the Kazakh Altai as being an element of the vegetation of the upper part of the forest belt, although of a type rather asocial and pertained to barren detrituous slopes. Thus, the Altaian population of the chickpea blue is separated from the closest Tarbagataian one with a considerable gap. Most probably, the species should occur in the Chinese Altai. So, the problem of the geographic limits and geographical distinctness of the subspecies under description remains open unless comparative material from there is available.

It is interesting that in the region studied practically all the ♀♀ of *Polyommatus icarus* had the same deep violet-blue colour of the wing upperside (colour plate XIII, figs. 9, 10) as the majority of the ♀♀ of *P. icadius* (yet they cannot be confused!), that well characterized a subspecies recently described from the mountains of South Siberia, *Polyommatus icarus korshunovi* GORBUNOV, 1995 (KORSHUNOV & GORBUNOV, 1995). Maybe the conditions of the physical environment (temperature?) in this region similarly influence these two very close species. The fact that on 20.–21.VI.1998 the brown ♀♀ were mostly fresh while the blue ones mostly very worn out is rather in favour of this suggestion. On the other hand, the absence of transitory specimens stands for the contrary.

Lastly, let us note that KAMELIN (1998) recently put forward a suggestion that the Dzhungarian chickpea in the Dzhasator valley is a result of an ancient (dated to the Late Quaternary) unconscious introduction by man. The discovery of its strict monophagous occupant evidences against this suggestion, as an occasional carrying not only of seeds but of whole plants (together with butterfly eggs) seems to be much less probable.

Acknowledgements

First of all the authors express their gratitude to ornithologists SERGEI TSYBULIN and MAXIM GRABOVSKI for their great help in the field during their expedition to SE Altai. Besides, V. IVONIN thanks Y. P. KORSHUNOV and O. KOSTERIN thanks V. DUBATOLOV for promotion of their participation in the expedition and both thank Y. S. RAVKIN for a permission to join this expedition of his laboratory.

References

- ARTEMOV, I. A. (1993): [Flora of the Katunskii Mt. Range (Central Altai)]. – Novosibirsk, 113 pp. (in russian).
- DYACHENKO, S. A. (1995): [Synopsis of flora of the Plateau Ukok]. In: Flora and Vegetation of Altai. Transactions of the South Siberian Botanical Garden. I. – Barnaul: Publishers of the Altai State University, p. 85–106 (in russian).
- GROUM-GRZHIMAILO, G. (1890): Le Pamir et fauna Lepidopterologique. – Memories sur les Lepidoptera. Ed. ROMANOFF, N. M. St-Petersburg. 4: 1–402.

- ZHDANKO, A. B. (1993): *Polyommatus icadius* (Lepidoptera, Lycaenidae), its taxonomy, biology, and distribution. – Zoologicheskii Zhurnal. 72 (2): 80–83 (in russian).
- KAMELIN, R. V. (1990): [Materials on the History of the Flora of Asia (the Altaian Mountain Country)]. – Barnaul: Publishers of the Altai State University, 240 pp. (in russian).
- KORSHUNOV, Y. & P. GORBUNOV (1995): [Butterflies of the Asian part of Russia. A handbook]. – Ekaterinburg: Ural University Press, 202 pp.
- KRYLOV, P. N. (1933): Flora Sibirea Occidentalis. VII. Rosaceae–Papilionaceae. – Tomsk: [Press of the Tomsk Botanical Department of All-Russian Society of Nature Explorers], p. 1149–1817 (in russian).

Explanation of colour plate XIII (p. 407):

Figs. 1, 2: *Polyommatus icadius cicero* subsp. nov., holotype ♂.

Figs. 3, 4: *Polyommatus icadius cicero* subsp. nov., allotype ♀.

Figs. 5, 6: *Polyommatus icadius cicero* subsp. nov., paratype, same locality and date as the holotype and allotype.

Figs. 7, 8: *Polyommatus icadius icadius* Gr.-Gr., ♂, Dzhungarian Alatau Mts., Southern Chain, massif Tyshkantau, 40 km NNE of Dzharkent, Tyshkan River, 2500 m above sea level, 24.VII. 1994, V. DUBATOLOV & O. KOSTERIN leg.

Figs. 9, 10: *Polyommatus icarus korshunovi* GORBUNOV, 1995, ♀, collected together with the holotype and allotype of *Polyommatus icadius cicero* subsp. nov.

Figs. 11, 12: *Polyommatus icarus korshunovi* GORBUNOV, 1995, ♂, same locality and date.

Fig. 13: A ♀ of *Polyommatus icadius cicero* subsp. nov. in natural conditions. "Dzhazator", 21.VII.1998.

1	3	5
2	4	6
7	8	13
9	10	
11	12	

addresses of the authors

V. V. IVONIN

Vystavochnaya str. 37/1, app. 81

Novosibirsk 630078

Russia

O. E. KOSTERIN

Institute of Cytology & Genetics SD RAS

Lavrentiev ave. 10

Novosibirsk 630090

Russia

Colour plate XIII

IVONIN, V. V. & O. E. KOSTERIN: A new subspecies of *Polyommatus icadius* (GROUM-GRZHIMAILO, 1890) from the Russian Altai (Lepidoptera, Lycaenidae). – *Atalanta* **31** (1/2): 171–177

Figs. 1, 2: *Polyommatus icadius cicero* subspec. nov., holotype ♂.
Figs. 3, 4: *Polyommatus icadius cicero* subspec. nov., allotype ♀.
Figs. 5, 6: *Polyommatus icadius cicero* subspec. nov., paratype, same locality and date as the holotype and allotype.
Figs. 7, 8: *Polyommatus icadius icadius* GR.-GR., ♂, Dzhungarian Alatau Mts., Southern Chain, massif Tyshkantau, 40 km NNE of Dzarkent, Tyshkan River, 2500 m above sea level, 24.VII. 1994, V. DUBATOLOV & O. KOSTERIN leg.
Figs. 9, 10: *Polyommatus icarus korshunovi* GORBUNOV, 1995, ♀, collected together with the holotype and allotype of *Polyommatus icadius cicero* subspec. nov.
Figs. 11, 12: *Polyommatus icarus korshunovi* GORBUNOV, 1995, ♂, same locality and date.
Fig. 13: A ♀ of *Polyommatus icadius cicero* subspec. nov. in natural conditions. “Dzhazator”, 21.VII.1998.

1	3	5
2	4	6
7	8	13
9	10	
11	12	

